

HOW RELEVANT IS EUSTACHIAN TUBE FUNCTION IN SURGICAL OUTCOME OF TYMPANOPLASTY?Abhinav Srivastava¹, Chander Mohan², Arjun Sengar³**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: The aim of the study is to assess eustachian tube function (ETF) and to evaluate the outcome of Tympanoplasty in relation to eustachian tube function in CSOM (tubotympanic) in dry and wet ears. Prospective study for a period of 1 year comprising of 100 patients diagnosed to have CSOM (tubotympanic type). ETF was assessed by Toynbee's test. Patients with normal ETF and with impaired ETF, with dry middle ear mucosa were taken up for tympanoplasty and those with wet middle ear with impaired ETF were taken up for cortical mastoidectomy with tympanoplasty. The ETF in these patients was analyzed and graft uptake was assessed clinically. A positive correlation was seen between the ETF and result of the surgery. In 91.1% of cases with normal ETF graft was well taken up whereas graft take up rate was 65.62% in cases with impaired ETF. Patients with normal ETF showed a good graft uptake when compared with those with impaired ETF. Methodology of treatment adapted for CSOM patients based on ETF proves that the eustachian tube plays a major role in the uptake of graft.

KEYWORDS: Chronic suppurative otitis media, Eustachian tube Function, Tubotympanic disease, Tympanoplasty.

INTRODUCTION: Eustachian tube plays major role in the functioning of middle ear. Gimenez F et al (1993) opined that a properly functioning Eustachian tube is an integral part of a normally functioning middle ear and the existence of good tubotympanic mucociliary drainage constitutes a favorable prognostic factor in the outcome of reconstructive surgery of the middle ear.¹ Choi et al concluded that tubal function as evaluated by inflation-deflation method was a good indicator of well aerated tympanum, as well as of better postoperative hearing attainment. They further stressed that tubal function can be used in planning and selection of surgical methods for tympanoplasty.² A pre-operative test of tubal function is important for achieving a satisfactory result of tympanoplasty. Three main functions of eustachian tube are ventilation and regulation of middle ear pressure, middle ear clearance of secretions, and protection against nasopharyngeal sound pressure and reflux of nasopharyngeal secretions. A normal aerated middle ear cavity and normal antrum are important for middle ear functions. Impedance audiometry is an essential tool to assess eustachian tube function (ETF). The present study is undertaken to assess the ETF in patient with CSOM with reference to its treatment outcome. Based on impedance audiometry findings, patients of tubotympanic disease are categorized as impaired and normal ETF. Patients with normal ETF were taken up for myringoplasty. Patients with impaired ETF, with dry middle ear mucosa were taken up for myringoplasty and those with wet middle ear were taken up for cortical mastoidectomy with tympanoplasty.

MATERIALS ND METHODS: This prospective clinical study was conducted in the department of Otolaryngology, Rohilkhand Medical College and Hospital, Bareilly, U.P. for a period of 1 year from

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December 2012 to December 2013. The study group comprised of 100 patients who were diagnosed to have CSOM of tubotympanic type. Detailed history was taken and clinical examination was performed. The age group of patients ranged from 15 yrs. to 45 yrs. There were 53 males and 47 females (table I).

A complete otolaryngological examination was performed to rule out any associated focus of infection, which could influence the result of tympanoplasty. Each patient was subjected to the routine blood investigations, pus culture and sensitivity, plain X-ray both mastoids AP-Law's lateral oblique view, pure tone audiometry, impedance audiometry, oto-endoscopy and diagnostic nasal endoscopy if required.

Assessment of eustachian tube function was done by Toynbee's test and cases were categorized in to normal ETF and impaired ETF, depending upon tests results.

Surgical procedures:

1. Patients with normal ETF and impaired ETF with dry ear were taken up for tympanoplasty.
2. Patients with impaired ETF, with wet middle ear were taken up for cortical mastoidectomy with tympanoplasty.

Post-operative management: Patients were started on suitable antibiotics one day prior to surgery and antibiotics were given for 3 days post – operatively, along with analgesics and antihistaminics. All cases underwent surgery by post aural route Mastoid bandage was changed on the 3rd postoperative day and dressing applied. The sutures were removed on the 7th postoperative day. After discharge Patients were reviewed weekly in first month and every 15 days in next 2 months postoperatively. Patients were evaluated postoperatively using otoscopy/oto-endoscopy. For final outcome following surgery the patients were evaluated as follows-

1. Successful outcome, with well taken up graft with good middle ear function.
2. Failed surgery, Graft failure or perforation .

RESULTS AND DISCUSSION: The study was conducted in the department of otolaryngology, Rohilkhand Medical College and Hospital, Bareilly from December 2012 to December 2013. The study group comprised of 100 patients between ages 16 to 45 yrs. who were diagnosed to have CSOM of tubotympanic type (table I). The ETF in these patients was analyzed and graft uptake was assessed clinically. The ETF was found to be normal in 68% patients and impaired in 32% patients (table II).

In this study a positive correlation was seen between the ETF and result of the surgery. In 91.1% of cases with normal ETF and dry ear, graft was well taken up whereas in 72.2% cases graft was taken up in patients with impaired ETF and dry ear. Patients with normal ETF with dry ear showed a good graft uptake when compared with those with impaired ETF and dry ear (table III).

It was further observed that graft uptake was 91.1% in dry ears where as it was 57.14% in wet ears in which cortical mastoidectomy was done along with tympanoplasty (table III). So apart from normal ETF, a healthy mastoid with dry ear appears to improve results in tympanoplasty.

Tos M (1998) observed that the ETF is an important prognostic factor in the outcome of middle ear surgery because of its primary role in the aeration of middle ear cavity.³

Cohn AM et al (1979) assessed ETF by using impedance audiometry (Toynbee's test). They observed that those with normal ETF showed a graft uptake of 95%, 75% graft uptake in partially

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impaired ETF, and 69% graft uptake in totally impaired ETF.⁴ Sen S et al (1998) assessed ETF by using impedance audiometry and found 80% graft uptake in those with normal ETF 80% graft uptake in partially impaired ETF, and 66% graft uptake in totally impaired ETF. In our study we had a similar results showing 92% success rate in patients with normal ETF, 68% in impaired ETF⁵

Takahashi et al (2007) analyzed tubal function using an inflation-deflation test in 78 cases with non-cholesteatomatous chronic otitis media, without ossicular damage and asserted that patients having poor pressure equalization ability showed considerably poor surgical outcomes, poor hearing restoration, spontaneous perforations, or persistent otorrhea⁶

Paparella M et al (2009) observed that diseased or edematous mucosa had a graft uptake of 50% when compared with dry middle ear mucosa which showed an uptake of 69.5% and in his study, he claimed that the preoperative factors such as dry or wet ear, site of perforation do not affect the graft take up rate⁷ Our study also shows 92% graft take up rate in dry ear with normal ETF and middle ear. All these studies and present study also corroborate the fact that a normal functioning Eustachian tube and a positive hearing on the outcomes of the results of middle ear surgery.

Brackmann DE et al(2010) observed that simple mastoidectomy in all tympanoplasties is a good practice. It increases the middle ear cleft space and that this is the good idea if there is compromised ETF.⁸

Age	No. of Cases	Male	Female
15-25	19	10	9
26-35	50	23	27
36-45	31	20	11
Total 100		53	47

Table I: Age & Sex Distribution

	Male	Female	Total
Normal	44	24	68
Impaired	13	19	32

Table II: ETF in CSOM Patients

ETF	Ear discharge	Surgery	No	Surgical success
Normal	Dry	Tympanoplasty	68	62(91.1%)
Impaired	Dry	Tympanoplasty	18	13(72.2%)
	Wet	Cortical mastoidectomy with Tympanoplasty	14	8(57.14%)

Table III

CONCLUSION: In this study the correlation between ETF and the graft uptake was analyzed and it was observed that there is a strong association between ETF and graft uptake. Surgical outcome was better in patients with normal ETF, So eustachian tube plays a major role in the graft uptake. In case of CSOM with impaired ETF patients, cortical mastoidectomy has been done to improve ventilation. So it is recommended that pre-operative Eustachian tube evaluation should routinely be done prior to middle ear surgery.

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Assessment of Eustachian tube function is quiet relevant in surgical outcome of tympanoplasty, as the results improve tremendously with good Eustachian tube function.

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